GAS JOURNAL, APRIL 16, 1947

VOL. 250 99th YEAR No. 4376

COKE EXTRACTION FROM CONTINUOUS VERTICALS

IT is 40 years since the dream of continuous carbonization was brought to realization. The retort had been placed vertically, coal was fed at the top and the residue was discharged at the bottom. The step to continuous feed and continuous discharge inevitably followed. The continuous vertical became established practice and in 40 years it has reached the position of making a larger proportion of to-day's town gas, at any rate in Great Britain, than all the intermittent systems combined. But designers have never ceased to aim at perfection. Their efforts are directed to the elimination of every single laborious manual operation from the retort house.

Mr. Chisholm in his Paper last month to the Eastern District of the Southern Association of Gas Engineers and Managers described his experiences with a new coke extractor now installed in one of the Glover-West vertical retort benches at Slough. The present position of continuous vertical practice is very interesting. In practically all plants now working the travel of the charge through the retorts is effected and governed by the discharger. Coal is fed through a gas-tight "valve" to an auxiliary hopper which forms a reservoir of coal in direct communication with the top of the retort. That coal flows into the retort as and when room is made for it by the mechanical removal of coke from the bottom. But the smooth flow of coal to the retort is conditioned by at least two phenomena. In the first place there is the "plastic layer," which carbonizers must never forget—the fact that all coals "melt" on heating to form a pasty, sticky mass, more or less dense and more or less troublesome according to the nature of the coal. If the charge remains static for a sufficient time the plastic layer becomes coked, but if it is moved before the lapse of that sufficient time the plastic layer must move with it over the face of the retort. In the second place the gases rising through the charge tend to leave deposits of pitchy matter in the relatively cool incoming charge, which deposits may add to the stickiness of the plastic layer. And, if our thought is reliable, even when the plastic zone moves without difficulty it will nearly always leave something smeared on the surface of the refractories. This "something" tends to grow and, together with the sealing effect of the deposits at the surface where the crude gas leaves the charge, gives rise to the necessity for rodding—one of those laborious manual operations which it is so desirable to eliminate from retort house operation.

As Mr. Chisholm remarked, there are, generally speaking, only two types of coke extractor in use to-day—the horizontal helical scroll of the Woodall-Duckham retort and the vertical helix (the "worm" extractor) of the Glover-West. All the rest of the proposals which used to appear so regularly in the patent news have gone into the limbo of the unsuccessful. Both these extractors, accidentally because of their very slow speeds of rotation, are actually moved intermittently, at intervals, however, which being of no more than, say, three minutes, are of insufficient duration for the complete coking of the surface of the incoming charge at the plastic stage. The new extractor is static for something like 40 minutes, a period which, as the Slough experience confirms, is more than sufficient for the coking of the top portion of the discharge. That, it is suggested, is the reason why rodding becomes unnecessary: there is no pasty mass in contact with the retort wall when movement takes place.

This is not the first installation of its kind, but the existing difficult position of coal supply and shortages of all sorts have prevented the realization of conditions in which definitive tests can be carried out to determine what effect the new departure will have on gas-making and whether it will operate equally well with all types of coal. No difficulty under the latter heading has been experienced so far either at Liverpool or at Slough where "there has been no trouble even with the most difficult coals." That there may be some interesting effects yet to be observed and explained is evident from the observations recorded on the different appearance and local occurrence of the scurf and on the increased pressures at the bottom mouthpiece. The slight, but definite, increase in the bulk density of the coke may also prove to be significant. And the very welcome observation on the stepping-up of the throughput may prove to indicate something of considerable value. We trust that when it is possible steps will be taken so to arrange matters that coal supplies to, and coke and gas produced by, this retort bench can be separately controlled and measured so that Mr. Chisholm and his progressive Chief may give us more valuable data upon which to judge the performance of the new coke extractor.

TECHNICAL BASIS OF WORKS PRACTICE

IT was perhaps modesty that led Mr. C. Stott, in a Paper to the London and Southern District Junior Gas Association, at their Convention last month, to the choice of the adjective "technical" rather than "scientific." Or perhaps he uses the word in the sense of "technological," since "technology" is defined as the science of the industrial arts. Yet there is really nothing high-falutin' about "science" either. It is, says Huxley, "nothing but trained and organized common sense, differing from the latter only as a veteran may differ from a raw recruit." But, however that may be, it is certain that the budding technologist must first be trained and exercised in the method of science. He should come to the Industry with a good general (liberal) education, but above all with the habit, already well-formed, of accurate observation and some skill in making deductions from observed facts. He should not be expected to bring very much more, and Mr. Stott is perfectly sound in saying that juniors must be given every possible guidance and encouragement in the next stage of their education, that of acquiring experience from real knowledge—*i.e.*, first-hand observation

—and that this guidance must be additional to any other possible educational opportunities which may be available.

Mr. Stott referred to "the educative influence of technical literature" and differentiated between those essays which deal with particular cases, limited in their application and interest to one peculiar set of conditions, and those which deal with general and fundamental principle. It is often difficult to distinguish. For instance, a little later on in his own Paper Mr. Stott proceeded to discuss in general terms the problems which arise in the operation of carbonizing plant, and yet he was really dealing, we think, with one only of the broad types of such plant. In any case, throughput is not a fundamental element of the problem. We are confronted to-day with a problem which is probably not capable of solution. Shortage of coal renders it imperative that we should make the very best use of it. But what is the best use? If all users were fully equipped with gas-burning appliances, and if all gas-works had the necessary plant, no doubt the best use would be to make the maximum volume of usable gas, even to the point of complete gasification, as for instance by carbonization followed by carburetted water gas. But we are very far from that position and the problem becomes one of making the maximum quantity of gas per ton compatible with getting the maximum production per unit of plant—something much more complicated than just throughput—and compatible with going as far as possible in the direction of satisfying the demands made on a two-fuel industry.

The junior will not, however, be called upon to deal with the problem at this high level, though he should be encouraged to appreciate the grand strategy of the plan to which his tactics must conform. He will not even make the decision on the size to which coal will be broken, or the scurfing routine, though he may soon be making observations and submitting reports which may lead to the modification of these and germane decisions. It is to be hoped that in most cases he will be employed in the first place in routine operation of plant which is adequately equipped with instruments and appliances by which all the main quantities can be weighed, measured, and observed. It is a pity that in carbonizing plant where hot coke is charged direct from the retort to the producer, fuel used in the process cannot be directly weighed. But there is no real excuse for the too-prevalent want of means by which the weight of coke ex retort house can be weighed. And there are far too many retort houses of other types in which for a trifling expenditure means could have been, and yet have not been, provided for weighing coke to producers.

Mr. Stott's Paper, which will be published subsequently in "GAS," was full of remarks which might have been, had it been possible, developed into long paragraphs of great interest and value. For instance, "indiscriminate and over elaborate testing is misleading." That might be the text for a long sermon on the type of instrumentation and the degree of accuracy which are requisite and necessary in the retort house. Instruments must be dust-proof, robust, capable of ready maintenance, and giving rather a good relative indication than an absolute value of the quantity measured. Scientific curiosity must not be discouraged, but routine testing should be confined to essentials. And above all "the behaviour of any detail of plant should never be a matter of opinion; in practically every circumstance, behaviour can be described numerically, and this principle should be rigidly applied."

We should like to select just one other of these pregnant remarks: "Any piece of carbonizing plant should rarely be exactly duplicated." Surely that indicates that Mr. Stott is aware that progress and development are more restless and unceasing in the retort house than perhaps in any other item in the gas-works process. The Paper ranged over the whole works, even to the costing office, but prominence was wisely given to the retort house. It is here that the intelligent junior, properly directed and supported, can most easily earn far more than his salary. Mr. Crowther said the other day in Scotland that he would like to see more heresies propounded in the Junior Associations. Well, these are not heresies, but they are bold, challenging expressions in the discussion of which juniors can spend many pleasant and profitable hours.

HEAT SERVICES IN NEW HOUSES

ONCE again the Gas Industry as a whole is to be indebted to the Gas Light and Coke Company, and Watson House, this time, for new weapons to fight the battle for gas in the new housing programmes. New appliances are there being perfected to raise still higher the efficiencies of coke and gas combustion. Particularly interesting are developments shortly to be made public of a new type of back boiler to give not only quicker heating but a sufficient output to serve radiators (and a heated towel rail) for background heating with little or no increase in fuel consumption and which can also be direct fired by gas in summer for bath-water heating. There is also a new calorifier for indirect heating by gas to get over the difficulty of hard water.

The disquieting aspect of this question of heat services in the new houses is that in spite of the Egerton and Simon Reports, in spite of the proven case for the use of gas and coke to save—and to save substantially—coal for domestic heating, and in spite of the lip service paid to these by the Ministry, local authorities are permitted to ignore all this and to build houses in which no attention whatever is paid to fuel economy. We are still confronted with the apparently ineradicable heresy that electricity is the cure for all ills. In the course of a Paper at the Convention of the London Juniors to which we have already referred, Mr. G. C. Holliday remarked: "In spite of the fact that at least four or five times the amount of domestic heat is at present being supplied by gas and coke as by electricity, it is indeed surprising that our Industry should so often be faced with quite serious difficulty in obtaining authority for providing equal facilities for gas in new houses." Don't let us pretend that the tenant has freedom of choice in this matter. "The fuel equipment he uses is being largely decided for him by the local authority and by those who approve the design of the house." Particularly is the absence of flues to be deplored because the provision of these, while in no way detrimental to the installation of electrical appliances by those who insist on them, is essential to the fitting of most gas appliances. In many designs it is practically impossible to use anything but electricity for "topping-up" (auxiliary room heating) and water heating.

There is something to be done in the design of flues "in order not to offend the architect's æsthetic susceptibilities"; and here again Watson House is coming to the rescue. But there is surely more to be done in the design of the houses themselves to secure economies in fuel consumption of any form. The visitors to America to whom we referred some weeks ago reported that even in the Northern States, in a climate more severe than ours, the whole house is kept at a comfortable temperature throughout the winter with very little, if any, additional fuel consumption. The result is partly due to the difference in the design of the house—an "open" design in which heated air introduced at the bottom and in the middle circulates naturally over the whole *enceinte*. Why should we be content with anything less in this country? Why should we accept a solution of the problem in which only the living room and kitchen are at a tolerable temperature, while starvation persists in the rest of the house? Why should our standard of comfort be lower than that of the rest of the world?

The Paper by Mr. Holliday concluded with an excellent "type" diagram showing the various load curves throughout the year and bringing out very clearly the advantage of using coke, which can be stored on the premises, for those

loads which reach a peak in the winter months, and with three tables which prove up to the hilt the decisive advantage from the point of view of coal economy (3½ tons against over 5 per annum)—and surely no one now doubts that this should be the criterion—of a judicious combination of gas and coke, over a similar installation in which gas is replaced by electricity and even over an installation in which solid fuel is used in the kitchen range all the year round for cooking and water heating.

This is a most useful Paper. Once more the technical case is proved. There is no technical problem left. If we want to save coal in domestic heating, we can do it and at a higher standard of comfort than we have ever before enjoyed. If we want to abolish smoke and dirt and household labour, we can do it. But to do it we must embark on a definite programme and above all we should see to it that the new houses are designed and laid out on lines which will secure success.

With the knowledge and consent of the writers, we publish below letters which have passed between Colonel R. H. Studholme, General Manager of the Association of Gas Corporations, and "Arbiter," the contributor to our issues of March 26 and April 2 of the articles on

"Before and After Nationalization"

"Arbiter," c/o "GAS JOURNAL." Sir,—I write with two objects.

First, to express appreciation of your very cogent and straightforward articles in the "GAS JOURNAL." As you know, the Gas Industry is apt to be inarticulate. Even when such an essentially non-political industry is threatened with dislocation by a great political experiment, few besides yourself have dared to point out the dangers to the public service. I believe, however, that your articles do express the opinions of many (probably the great majority) of those in the industry.

The British Gas Council did suggest to the Ministry that this was an ill-chosen time for nationalization. The critical fuel crisis has since lent strength to that view.

Secondly, I note that your list of seven alternatives does not include the most recent—the proposals put forward in this Association's booklet, "Reorganization of the Gas Industry." Copies have been sent to all gas undertakings, and their response has been encouraging. In case you have not yet seen the booklet, you may like to have the enclosed copy, together with prints of two covering letters, and reprint of an editorial comment (from the "*Gas World*," Feb. 15, 1947). Any constructive criticism or comment which you may care to make would certainly be appreciated, and would be carefully considered.

May I make one further comment on your articles? You rightly question the fairness of Stock Exchange prices. You show clearly how (in the case of sliding scale companies) the Government's refusal to revise stale standard prices has reduced dividends, and so reduced market prices. You also mention that the threat of nationalization has done likewise in all cases.

When this last point was recently argued in Committee on the Electricity Bill, the Government blandly replied that it was taken care of by the pre-election Stock Exchange prices, offered as alternatives. They professed not to understand that, even if those prices *were* fair before the election, they are certainly not fair to-day. Like standard prices, they are stale. Owing to inflation and other causes, no comparable securities not threatened with nationalization could be bought to-day at pre-election Stock Exchange prices. Neither could Government securities, or motor cars, or cabbages. Stocks of Breweries or Insurance Companies stand 10% to 50% higher in terms of Mr. Dalton's cheap pounds. He himself might not be pleased if compelled to sell all his own private investments at pre-election prices.

This loss of capital value carries a consequential loss of income. The latter has nothing to do with the loss of income resulting from the "better security" of compensation stocks. It is additional to that loss.

I think you will agree that this is a point not generally understood. It accounts for a large part of the 40% income loss complained of on page 31 of the "GAS JOURNAL" of the 2nd instant.—Yours faithfully, R. H. STUDHOLME, General Manager, Association of Gas Corporations.

Dear Colonel Studholme,—Your letter of the 11th inst. has reached me through the Editor of the "GAS JOURNAL." First—thank you for your complimentary appreciation.

The omission referred to is regretted. The Report of the Association of Gas Corporations was truly comprehensive and should go far to strengthen the many alternative proposals against nationalization submitted to the Minister of Fuel and Power. The Minister professes to be concerned with the "deliveries of the goods." The Gas Industry has very recently delivered more "goods" than the Nationalized Coal Mines found convenient, and if the Industry can obtain raw materials and the necessary plant and machinery, it will, as always, satisfy all the demands made upon it. Even during the blitz period it was proud of its achievements.

Users of gas ask themselves: What can nationalization do more than private enterprise has been doing for so long? There has been no answer or pointer of any sort to this. The question could not be answered in favour of nationalization. I wrote the articles for the "JOURNAL" (1) to show clearly that Parliament at present virtually governs and controls the Industry in every essential needed to protect the user of gas and has power to insist on any essential lacking, and (2) to urge that, if nationalization is to come, shareholders, consumers and employees should at least be treated fairly.

I entirely agree with your views as to the yardstick for arriving at the basis of compensation. There are few, if any, willing sellers, and there would be none on the same basis as the terms presented to Railway Stockholders. The Gas Industry's assets are not worn out. Most assets are modern. Investors (not speculators) are likely to lose capital and income. The Government should be scrupulously fair in dealings of this nature. How can any Government expect honesty unless it sets such a standard?

The British Gas Council have been somewhat inarticulate as to the hurt that may be inflicted on proprietors, but in mitigation it can be urged that the Council do not favour nationalization. They have as a consequence concentrated on the manner in which private enterprise can improve on the present position.—Yours faithfully, "ARBITER."

Letter to the Editor

Noisy Combustion of Coke

DEAR SIR.—Your special correspondent in his article "Low Ash Coal in Carbonization" ("JOURNAL," April 9) refers to coke testing for domestic purposes and states that it is *well known* that high ash coke "talks very loudly" during combustion and its note varies with the content of ash in the coal. This is all very new to me and prabably refers to coals carbonized and quenched under identical conditions, but I would like to refer your contributor to the discussion on the paper of Lloyd, Bell, and Hodsman on the behaviour of cokes in the open grate, (*Trans. Inst. of Gas E.*, 1933-34). There I gave particulars and details of experiments which proved that noisy burning coke was a product of shock quenching with water, leaving the coke (including ash) under stress and strain. Coke (including ash) when steam quenched or cooled with inert gases is annealed and burns noiselessly. High moisture content in an annealed coke does not make it burn noisily.

Yours faithfully,

F. FIRTH.

17, Thorn Lane,
Leeds, 8.
April 14, 1947.

Personal

Mr. KENNETH D. GENGE, of the South Suburban Gas Company, has been appointed Assistant Engineer to the Eastbourne Gas Company.

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Following the death of Mr. A. B. Auty, General Manager of Clapham Brothers, Ltd., Constructional Gas Engineers, Keighley, the Directors have appointed Mr. J. C. BARWICK to fill the vacancy.

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Mr. SAMUEL P. ORMEROD, Works and District Superintendent of the Ossett Gas Department, has been appointed Assistant Gas Engineer to the Batley Gas Department. He has previously been engaged in the Gas Industry at Bridlington and Colne. Mr. Ormerod succeeds Mr. L. W. SMITH, who has left Batley to take up an appointment with the Gas Light and Coke Company.

News in Brief

Calverley and Horsforth Gas Company has given notice of an increase in the price of gas from 11½d. to 1s. 1d. per therm.

When Coke Supplies are again available for domestic use at Darwen, priority will be given to owners of glass houses who are growing food.

The Registered Office of the Bombay Gas Company is now at Broad Street House, 54, Old Broad Street, London, E.C.2. (Telephone London Wall 2913.)

The Summer Meeting of the Southern Association of Gas Engineers and Managers has been fixed for June 26. As already announced, the annual general meeting will be held on May 20.

Chelmsford will be the venue for the Spring Meeting of the Eastern Association of Gas Engineers and Managers on May 22 and 23, under the Presidency of Mr. F. N. Howes, Engineer and Manager of the Chelmsford Gas Department.

Permission for Further Borrowing is being applied for by the Stamford and St. Martin's Gas Light and Coke Company. It is proposed to spend £20,000 on extensions to the carbonizing plant, £7,000 for a new 120,000 cu.ft. gasholder and £3,000 on mains extensions.

Local Ratepayers have benefited to the extent of £22,680 from the profits of the Darwen Gas Department in the last 20 years. Reporting this to the Town Council, Alderman R. Marsden, Chairman of the Finance Commitee, urged that local authorities should be allowed to retain accumulated profits and reserve funds.

The Gas Light and Coke Company is about to increase its fleet by the addition of five more ships with a cargo capacity of about 13,000 tons. The company owns at present 19 colliers, the largest of which—*Mr. Therm*—carries 4,500 tons of coal. Most of the Company's coal comes by sea from the Durham coalfields.

Shortage of Gas Mantles is so severe in Dundee that when Woolworths received the first large quota for nine months customers had to be restricted to two mantles each, of which there were three sizes on sale. People queued from 8 a.m., and by 11.30 most of the 3,800 mantles had been sold.

The Progress Made by the Gas Engineers' National Guild will render the first Annual General Meeting of considerable importance. This meeting is to be held at 4.45 p.m. on June 3, at Unitas House, Livery Street, Birmingham. The date coincides with the first day of Institution week, and a large attendance of members is expected.

The Staff and employees of the Rhymney and Aber Group of Gas Undertakings were entertained at dinner by the Directors on Mar. 24. In the absence of Colonel Moncrieff Carr, O.B.E., T.D., Managing Director of the United Kingdom Gas Corporation, Mr. J. Prosser Jones, Deputy-Chairman of the Rhymney and Aber Group of Gas Undertakings, presided. Among those present was Mr. Barton Grainger (Engineer, Manager, and Secretary, Rhymney and Aber Group of Gas Undertakings).

Exclusively Engaged on Government Work during the war, John G Sutherland & Sons, Ltd., are now once more able to make and supply gas meters, and have considerable repair capacity available. The death during the war of Mr. John G. Sutherland caused a complete suspension of meter manufacture, which has since only been resumed since the return of Mr. Ian G. Sutherland from the Forces. Mr. G. W. Toman has been appointed Works Superintendent, and in carrying out its reconstruction policy the Company hopes to continue to improve the efficiency of its products.

A Coal Crisis which threatened a complete stoppage of gas supply in Dublin last week was, at least temporarily, averted when 2,500 tons of coal intended for the Irish Transport Company was diverted to the Alliance and Dublin Consumers' Gas Company, and a further 450 tons was brought in by one of the Company's ships. It had been announced earlier that notice had been given to 1,100 employees because of the shortage of coal, and that gas supplies, already restricted to five hours per day, might cease at the week end. It is hoped that these supplies will keep production going until the first portion of a new weekly quota from Britain arrives, but it is still not certain that the existing five hours per day supply of gas in the city can be maintained for an indefinite period.

Members of the Executive Staff of George Wilson Gas Meters, Ltd., last year entertained the Directors to dinner. On Mar. 28 the Directors reciprocated this hospitality, following a meeting held at Coventry of all the representatives and branch managers. An enjoyable evening was spent, during which a snooker competition was won by Mr. C. Shepherd, Superintendent of the Blackpool Branch, who beat Mr. F. C. Wilson, Director, in the final, while in a darts competition Mr. E. Foster, Meter Shop Superintendent, and Mr. A. H. Barton beat Mr. G. E. Withers, Director, and Mr. R. W. McIndoe, Wolverhampton Branch Superintendent. Mrs. Dorothy Barton sang a number of songs, and Mr. J. H. Metcalfe, Manchester Branch Superintendent, and Mr. F. Greenfield, London Branch Superintendent, entertained on the piano.

£1,250,000 Plant for West Yorkshire

One of the largest gas producing plants ever to be built in this country is to be erected by the United Kingdom Gas Corporation at Tingley in West Yorkshire. Approval has been given by the Ministry of Fuel and Power to proceed with the work, the site has been bought, and arrangements are now being made with the National Coal Board for making the site ready so that the scheme can be put in hand with the utmost speed.

The first unit will cost £1,250,000 and will have a capacity of 7,000,000 cu.ft. a day. It will carbonize 500 tons of coal a day and produce from it in addition to gas some 275 tons of solid smokeless fuel and 25 tons of tar. It will take four years to complete. Eventually it is proposed to double the initial unit, thus giving the whole plant a capacity of 14,000,000 cu.ft. a day and making it into one of the four largest gas-works in the British Isles.

The West Riding Gas Distribution Company will own and operate the works, pumping the gas under pressure into its grid system which supplies 17 towns in West Yorkshire.

Statutory powers were obtained by a Special Act in the last session of Parliament authorising the scheme, but it was planned as far back as before the war to meet the steadily growing demand for gas for industrial use and for new housing in West Yorkshire. In this industrial area more than 18,000 new houses are scheduled for building. The principal industries that will be served include enamelling, wire-production, glass-making, acid manufacture and light engineering.

Diary

Apr. 19.—London and Southern District Junior Gas Association: Visit to High Wycombe Works of the Uxbridge, Maidenhead, Wycombe, and District Gas Company.

Apr. 19.—Manchester and District Junior Gas Association: Visit to Stockport Gas-works. "Our Stake in Industrial Gas," T. H. Pardoe (Stretford).

Apr. 19.—Yorkshire Junior Gas Association: "Canteens in Industry," E. S. Carter (Halifax). Britannia House, Bradford, 2.30 p.m.

Apr. 21.—London and Counties Coke Association. Finance Committee, 11 a.m. Executive Committee, 11.30 a.m. Central Committee, 1.30 p.m. Gas Industry House.

Apl. 24.—B.G.C. Domestic Development Committee. Gas Industry House, 2.30 p.m.

Apr. 24.—Industrial Gas Development Committee, Manchester, 10 a.m.

Apr. 25.—London and Southern District Junior Gas Association: "The Woman's Point of View," Miss Maywen Godby. Gas Industry House, 7 p.m.

Apr. 29.—Midland Junior Gas Association: Annual General Meeting, followed by Address, "New Methods and Materials for House Construction," A. G. Day (Building Research Station).

Apr. 29.—Southern Association of Gas Engineers and Managers (Eastern District): "Mechanized Accountancy and Statistical Work as Applied to a Gas Company," J. D. Thomas (North Middlesex Gas Company). Gas Industry House, 2.30 p.m.

May 1.—Solid Smokeless Fuels Federation: Executive Committee Dorchester Hotel, Park Lane, 11.30 a.m.

May 7.—London and Southern District Junior Gas Association: Visit to the Works of Smiths Meters, Ltd., London.

May 9.—Manchester District Association of Gas Engineers: Annual Meeting and Luncheon, Midland Hotel, Manchester,

May 9.—North of England Gas Managers' Association: Annual General Meeting: Address by Dr. E. V. Evans. Newcastle, 2.15 p.m.

May 16.—London and Southern District Junior Gas Association: Annual General Business Meeting. Gas Industry House, 7 p.m.

May 22-23.—Eastern Association of Gas Engineers and Managers: Spring Meeting, Chelmsford.

Sagem Golfing Society

The Spring Meeting will be held at the Hendon Golf Club on Wednesday, May 21, the day after the meeting of the Southern Association of Gas Engineers and Managers. Members who have not received notice or any member of the Southern Association who wishes to play should communicate with the Hon. Secretary, Mr. L. Trewby, 65, Nightingale Road, Rickmansworth.

Modern Homes Exhibition

IT was but a few weeks ago that we gave a descriptive account of the *Daily Mail* Ideal Home Exhibition. Five days before that terminated there commenced on March 25 another exhibition of apparently similar type, sponsored this time by the *Daily Herald*, and bearing the title Modern Homes. The similarity is, however, confined primarily to the name, for upon inspection it is clear that the subject of attractive and labour-saving post-war homes has been approached from an entirely different angle; the accent is upon practicability. It was realized by the planners that the public are tired of being tantalized by displays of unprocurable goods or goods obtainable only by surrendering dockets and coupons, and it was decided therefore to show what can be done in the present hampering circumstances and to work within the same limits as the public.

The exhibition is housed in Dorland Hall, S.W.1, and is arranged in such a way that interest is maintained and the various exhibits displayed to advantage. Entering through a "labour-saving" garden in which stone and evergreens predominate, the visitor is confronted by the bright and unusual stand of the British Gas Council. With an eye to strictly practical ways and means, the stand shows how an old basement kitchen can be converted to an easy-to-clean, bright and modern one. The transformation scene is cunningly arranged in three parts: firstly, the basement before conversion with inconvenient placing of appliances, intricate plumbing, and numerous dust traps; secondly, the results obtainable with such alterations as can be carried out to-day, including moving the sink beneath a window, the replacement of one wall section by an insulated glass brick wall giving increased illumination, the addition of a refrigerator and water heater, and certain structural alterations, including the provision of a partition partially dividing the room; and lastly, the kitchen as it will be when the latest type of cooker, sink unit, breakfast bar, and cupboard accommodation have been added. The first two scenes are depicted merely by wall diagrams, but the final stage is exhibited in full-scale form, complete with an Electrolux 151 refrigerator, an Ascot 32/6 multipoint instantaneous water heater, and a Radiation F.202 cooker. The brain behind this ingenious example of practical conversion is that of Mrs. Darcy Braddell.

The other four full-size rooms in this section of the ground floor include the Womansense living room, heated by a cross between the open grate and the closed fuel-conservation stove which can be adapted to supply ample hot water and background heating; a "teen-age" room combining the properties of bedsitting-room, study, workroom, laboratory and playroom; a children's bedroom-cum-playroom; and an all-electric kitchen. Exhibits of coupon-free fabrics and domestic labour-saving devices line the walls and lead to an enquiry bureau and the Womansense Theatre.

The theatre is a novel and effective feature and will no doubt prove popular with visitors. Here experts give demonstrations and talks on various subjects of interest to the housewife and mother; such topics as fashion, beauty, cookery, physical culture, and child-care are among those featured. In addition, special programmes are put on by the British Gas Council, Ascot Gas Water Heaters, Ltd., the Ministry of Food, and the Refrigerator Association. Of the two 20-minute playlets devised by the B.G.C., one shows how a careful choice of inexpensive equipment can enable a "bachelor-girl" living in a one-room flatlet to prepare her own meals quickly and with a minimum of trouble, and the other how gas makes easy the task of home laundry. With the combination of a tasteful and adequate theatre, equipped with a stage sufficiently large to allow for a reasonable quantity of "props" and moving about, and well-rehearsed and entertaining sketches, the Gas Industry has a potent propaganda force.

On the floor above are more furnished rooms: a bedroom and living-dining room, and a flat in two rooms—designed, as was the converted kitchen, by Mrs. Darcy Braddell—equipped with gas cooker, refrigerator and water heater obtainable by those holding conversion licenses. Here too are displays of television, pottery, glass and wallpaper. Returning to the ground floor and continuing the snake-like path between the exhibits, two more complete rooms are to be seen. The first is a bathroom of the latest design, the second a new kitchen exhibited by the Ministry of Health and of a type already installed in many houses recently constructed. Cooking is by gas and a gas circulator supplies additional hot water. Room-heating is effected by a solid-fuel economy stove. The Ministry of Health has its own stand and gives particulars of recent progress.

The exhibition is valuable in that it tackles furnishing problems from a realistic viewpoint—although the designers good fortune in shopping is somewhat exceptional—and it does so successfully. It is produced with the co-operation of several Ministries and other bodies, in particular, the Council of Industrial Design. A study of the exhibition shows conclusively that the Gas Industry is recognized as one of the most potent factors in the move to give the public efficient and attractive modern homes.

Our photographs show (left) the kitchen area of the 2-room flat, and (below) the Minister of Supply, The Rt. Hon. John Wilmot, M.P., and Mrs. Wilmot, who opened the exhibition, with Mr. A. Brydone Seton, Chairman of the B.G.C.'s Publicity Committee, examining the B.G.C. stand.

Oil Gas in Continuous Vertical Retorts

By A. H. BURTON, A.M.I.Mech.E., M.Inst.Gas E.,
Assistant Engineer and Manager, Warrington Gas Department

FOR a period from 1927 onwards, the market price of tar and its products was far below its value as gas, and the writer conducted a series of experiments to determine the possibility or otherwise of carbonizing tar in continuous vertical retorts. Oil is now being used and the following is a brief account of the technique employed.

The cover at the top of the retort is drilled to pass nominal bore 1¼ in. w.i. pipe. This is termed the "drop pipe." To its upper end a 1¼ in. cross is screwed, the top branch being bushed down to ⅜ in. and accommodating the oil supply line. Low pressure steam, controlled by a reducing valve and calibrating nipple, is introduced into the annulus formed between the concentric pipes. The steam serves three purposes: (1) prevents cracking of the oil in the drop pipe; (2) provides an initial pulverization of the oil; (3) produces a slight injection effect.

The optimum length of the drop pipe was determined experimentally in the following manner. It was appreciated early in the experimental work that only a limited quantity of steam could be used, as the capacity of the offtake pipes would always be the limiting factor. With a fixed weight of steam per hour a drop pipe 16 ft. long was introduced into the retort. This became choked with gas oil carbon in a comparatively short time, and the lengths were progressively reduced until, with a drop pipe 8 ft. long, no deposition of gas oil coke occurred. Coal gas, oil gas, and blue water gas are produced concurrently in each retort fitted with the oil supply.

A test period was fixed as one month, 6 a.m., Feb. 18, 1947, to 6 a.m., Mar. 18, 1947. Results are given in the tables below.

Gas Analyses
Oil per retort per hour

	1.3 gall.	5.2 gall.	10.46 gall.	Town gas
CO_2	4.6	7.8	3.8	4.2
CnHm ..	2.2	3.5	4.8	1.6
O_2	1.3	1.7	1.2	0.5
CO	16.9	23.8	11.5	17.7
H_2	40.2	32.0	34.9	47.3
CH_4	24.6	26.9	36.7	21.9
N_2	10.2	4.3	7.1	6.8
Calc. C.V. ..	481.0	530.6	629.1	465.8

Coke Ignition Tests

	Sample 1 Oil to retort	Sample 2 No oil to retort
Grading ..	2 in. × ⅜ in.	2 in. × ⅜ in.
Coke used ..	12 lb.	12 lb.
Gas used ..	23 cu.ft.	34 cu.ft.
Ignition time..	31½ minutes	42 minutes
Fire burnt ..	2¼ hours	2¼ hours
Appearance ..	Bright and an appreciable amount of flame, slightly yellow	Normal, with small blue flame

Coke—Volatile Matter
Dry at 105° C.

2.8% 1.4%

Tar

	Sample 1 Oil to retort	Sample 2 No oil	Gas oil
Drop point	78° C.	76° C.	155° C.
	12%—100° C. (including 3% H_2O)	1%—100° C.	3%—200° C.
	18%—170° C.	2%—180° C.	10%—210° C.
	19%—180° C.	4%—200° C.	15%—220° C.
	20%—200° C.	5%—210° C.	19%—230° C.
	21%—220° C.	7%—220° C.	23%—240° C.
	22%—230° C.	12%—230° C.	31%—250° C.
	24%—240° C.	17%—240° C.	35%—260° C.
	27%—260° C.	22%—260° C.	44%—270° C.
	37%—280° C. Flask dry	25%—280° C.	50%—280° C.

Summary

Gas oil used..	gall.	23,302
Coal carbonized	tons	6,761
Therms made		576,337
Therms per ton with oil		85.24
Therms per ton, Apr. 1, 1946, to Feb. 18, 1947 ..		81.04
Difference for test period		4.2
Gas oil per ton of coal carbonized	gall.	3.5
Therms oil gas at 1.0 per gall.		2.8
Difference due to heavier steaming		.7

Test conditions—
First week, 4 retorts on oil
Second, third, fourth weeks, 6 retorts on oil

Retort, days in test period	1,024.3
Percentage of oil gas retort days to the whole ..	15%

Taking the yield per ton Apr. 1, 1946, to Feb. 18, 1947, as the devisor, then $\frac{576,337}{81}$ = 7,115 tons coal required for test period.

Coal actually used for test	tons	6,761
Coal saved during test period		354=5% approx.

Comments

The introduction of oil in excess of 10.5 gall. per retort per hour leads to channeling and oil in the coke hopper.

No undue deposit was observed in the offtake pipes, and no bottom pressure accumulated even with maximum input of oil. With only a portion of the retorts controlled by one retort governor being on oil, it was observed that while these were under a slight pressure at the rodding holes, those working on coal only were under slight pull conditions. No noticeable difference in the travel of the charge was apparent as a whole, but on occasions there appeared to be some slight tendency for the charge to move more freely in the retorts taking oil. The test was carried out on a Woodall-Duckham lambently heated setting; nominal throughput per retort per day, 7 tons.

The writer is unaware if the whole of the work is original, as no patent application has been lodged and therefore no search has been made. The information is freely placed at the disposal of any who may wish to conduct further experimental work, or to duplicate the installation described.

Record Year at Cheltenham

Nearly 500 guests, comprising the staff and employees of the works, distribution, and central offices, and including representatives of the branches at Tewkesbury, Pershore, Broadway, Campden, and Bidford, attended the annual dinner of the Cheltenham and District Gas Company at the Town Hall, Cheltenham, on Mar. 24. Mr. J. Marshall, Director, presided in the absence of Mr. G. M. Gill.

Mr. A. L. Morris, General Manager, proposing the toast of the Company, said it had been in existence for 128 years and had grown tremendously recently, with a gas output in 1946 of 1,259 million cu.ft., an increase of 59 million cu.ft. over the previous 12 months. The area supplied by the Company was 350 square miles, and included most of the towns and villages in North Gloucestershire, and the output had increased by more than 100% in the space of 10 years.

The employees of the Company now numbered 500, and individual records of long service were numerous. Last year 24 employees retired on pension, and the aggregate of their service amounted to no less than 1,032 years.

In his reply, the Chairman extended a special welcome to the returned men and women from the Forces. Since 1939, he added, the Company's output was 74% greater, but what their future would be he could not foretell. It was possible that before the next annual meeting they would be nationalized.

Mr. C. R. Ingham, Chief Engineer, proposing the toast of the "Town and Guests," said he hoped the Corporation would not make the mistake of trying to make Cheltenham any bigger.

The Mayor (Councillor H. T. Bush), in reply, said he was sure he spoke on behalf of the great majority of the people of Cheltenham when he said that the Cheltenham Gas Company, during the past few troubled months, had done a great job of work. Whether or not the nationalization of the Industry came to pass, he was quite certain that the service rendered by the undertaking in the locality would not be improved on any count.

Edinburgh Gas Department's fuel crisis black-out ended on Mar. 28, and full pre-crisis gas lighting has now been restored. The decision for increased street lighting, which was taken by the Corporation Streets and Buildings Committee at a recent meeting, will operate for only a short period, for with the introduction of double summer time the usual summer period restriction, which will extend over 14 weeks, will begin. Bailie Robert Hamilton said that when the Government asked for the black-out, Edinburgh did it completely, but the crisis had passed its peak and other cities were having modified lighting. Bailie Poole remarked that he could not understand why Edinburgh should penalize itself when other Scottish cities had no black-out.

Kidderminster Gas Company: 1818-1947*

By PERCY DOUGALL, A.M.I.C.E., A.M.I.Mech.E.

THE Kidderminster Gas Company was established in 1818 and has had Acts of Parliament in 1818, 1867 and 1906, and a Basic Price Order in 1932. The first Act was entitled "An Act for the better lighting of the Borough of Kidderminster in the County of Worcester with Gas. 58 Geo. III. Sess. 1818," and as is usual with Acts of that date, it is "for the greater advantage of the inhabitants of Kidderminster that the streets and other public passages and places therein were better lighted by Inflammable Air, Carburetted Hydrogen or Coal Gas," and from King's Treatise, "Early in 1817 Clegg, after having ably carried out the duties devolving upon him, retired from the service of the Chartered Gas Company, for the purpose of erecting gas-works to supply Birmingham, Bristol, Chester, Kidderminster, Worcester, and other places." Another interesting extract is from the Association of Gas Engineers and Managers of England and Scotland in 1886 when Mr. Annan, then Manager of Wolverhampton, was President of the Midland Association. He said: "On July 13 some of the Committee visited Kidderminster and inspected the gas-works. They arranged with Mr. Bradley, the Engineer there, to prepare a specification for lighting Wolverhampton with 800 lights."

Round Houses

There are no particular records prior to 1870 other than the minute books, which are very vague and general. When the works were built in 1818 there was a small holder of 11,000 cu.ft. capacity and two years later a contract was entered into for a second one of 27,500 cu.ft. capacity. As was the rule then, both holders were built inside octagonal brick buildings known as "Round Houses," as a Royal Commission, presided over by Sir Humphrey Davy, insisted that all holders of greater capacity than 5,000 cu.ft. must be so safeguarded. In view of this it is rather interesting to find that the Manager's house was built on three sides of the smaller holder. The larger house was in existence until 1930 when it was removed to make way for a waterless holder. The roof of this house was a masterpiece and built of beautiful pitchpine in two sections, with two main principals side by side about 4 ft. apart, and at the centre and at the extreme ends were bearings for pulleys over which apparently ropes passed from the centre of the holder to counterbalances at the two ends of the principals.

By 1867 the works had reached 35 million cu.ft. per annum and apparently a large growth was anticipated, for in that year application to Parliament was made for a new Act and they engaged Mr. Hugh Young, an Engineer and Director of one of the Birmingham Gas Companies, to design and supervise the erection of new plant, and the work he did was admirable. He built a new retort house, battery condensers, scrubber, a table engine with belt-driven Rootes exhausters and driving four pumps by a huge cast iron four throw crank, boiler house, meter house, four 14 ft. square purifiers and a column guided holder of 388,000 cu.ft. capacity. Of these items, the retort house as he built it contained seven beds of six through retorts, ultimately converted to six beds of regenerators with eight retorts each and finally with a combined de Brouer stoking machine. These were in continuous use as a retort house until 1928. That house is now a coke store and contains a Lancashire boiler. The condensers were in regular use until 1934. The exhausters, boilers and meter were all in a neatly designed building, the exhauster house and meter house still being used for their original purpose, the boilers having been moved many years ago. The purifiers were scrapped 40 years ago. The gasholder was in constant use until 1939 when it had to be inspected under the Factory Act of 1937, and after two repairs in 1939, it is still in use to-day and here I should like to pay tribute to the foresight of a man who in 1868 built a holder for a works of 35 million cu.ft. That 63 years later was still the main holder for a works when the output was six times the size, and now after 80 years is still our second string when our output has increased by nearly twelve times the original output for which it was built.

Island Site

A peculiar situation is that Kidderminster gas-works is on an island. This statement has frequently been challenged, but it is sufficiently true that every main from the gas-works has to cross a bridge to reach the rest of the town. The cause of this island is that the canal crosses the River Stour at a point 200 yards above the gas-works and the other end of the island is where both the canal and the Stour join the Severn at Stourport. Incidentally Stourport Gas-works is on the same island. The essential part of the island covers 23 acres. In addition to the main island, there are three sluices dating from the days of water-driven mills, which make two other large islands, and the total number of bridges that we have to negotiate because of these water-courses and the railway within the Borough is 44.

Between 1868 and 1913 the main alterations to the works were two holders, approximately 64 ft. in diameter, which were converted from single lift to double lift, a retort house almost identical to the one built by Hugh Young, a 12-ton weighbridge, sulphate of ammonia plant, Babcock boiler, five purifiers, a rotary scrubber, larger exhausters and the conversion of one retort house between 1894 and 1896 from direct fires to regenerators.

Extensions Between the Wars

I took over in 1913 and put in a de Brouer stoking machine with the necessary electrical equipment, which came into regular use a week before the 1914 war broke out. During the first war we opened what in those days was considered a modern showroom. In 1920 we made use of the old Round House, which originally contained the larger holder, for a Tully plant, and a year or so later commenced extensive main laying, taking in some outlying villages. Our make then began to show considerable increase, so we put in 10 Woodall-Duckham retorts with a waste heat boiler and closed down the horizontal retorts and Tully plant. The only unusual item in the vertical retort house is that an Avery automatic weigher weighs the coal in 5 cwt. on a deadweight balance and records each time it tips. This has many advantages.

We were then beginning to feel a shortage of holder capacity and after due consideration adopted a M.A.N. waterless holder. This holder has a capacity of one million cu.ft., is 100 ft. in diameter and 150 ft. high. There were two main reasons, apart from the cost, for this. The first was that the works is built on a running silt which has always been a great trouble and made it almost impossible to put a holder of 100 ft. diameter in a masonry tank on that site, and one in a steel tank undesirable; besides in those days we could not have expected more than a three lift, which would have provided storage capacity of under 750,000 cu.ft. The second reason was that at that time we were short of land (the area of the works is only 2.78 acres), but we have now acquired a piece of land in the neighbourhood which should cover the Company's requirements for many years.

We ordered two vertical retorts in 1933. In 1934 we put in a two million cu.ft. water-cooled condenser, two more retorts and a reverser valve on the purifiers, which we have found most beneficial.

Water Gas Plant

In 1937 we considered increasing the number of vertical retorts, but instead built a 500,000 cu.ft. carburetted water gas plant, and rebuilt the two lift column guided holder as a three lift spiral relief holder.

Up to 1937 our demand was increasing but we seemed to be reaching saturation point, so before committing ourselves to heavy capital expense, we temporized by putting in the C.W.G. plant which we considered would see us through to about 1942, before which date we estimated we would know whether to launch out or carry on as we were doing. For the same reason we only repaired the inner lift of the column-guided holder built by Hugh Young in 1868.

During May, 1939, we opened the column-guided holder. We only lowered the water about 6 ft. and the condition of the plates inside was excellent and the holder generally in good condition. The only adjustments that had to be made were on the swan necks. The outer lift had not been used for some years and as the cup and grip needed repairs, the contractors said we would require to empty the tank before they could do repairs to them. In view of the fact that we had one million cu.ft. capacity in the waterless holder and 185,000 cu.ft. in the spiral holder (should it be needed for coal gas), we felt that it was only necessary to put the top lift of this holder back into commission, but we realized our mistake on that fateful Sept. 1, 1939, when we received a telegram from the Board of Trade instructing us to empty and purge the waterless holder. At the time this order was received, the old holder was still under repair, so it meant we would be supplying 720,000 cu.ft. gas per 24 hours and only relying on the spiral holder of 186,000 cu.ft. capacity which we had to purge and bring into commission

*Presidential Address to the Midland Association of Gas Engineers and Managers Mar. 20.

as a town gasholder and later the top lift of the old holder. We had a hard fight with the Board of Trade, but they refused to allow this waterless holder to be put back into use. It was put back into commission in March, 1944.

M.A.N. Holder

Long before the war I had realized the apparent danger of a waterless holder under war conditions and had worked out a scheme by which I would remove part of the roof and put a light wooden roof on the piston, and would have drained the rain off. None of the experts saw my scheme, but they declared it unworkable. Apart from that, however, as the war went on I realized that the risk of an explosion would have been little more with the holder in operation than lying idle. When the holder was in use and the piston in the ideal position for producing the maximum explosion, that explosion would be very small compared with even a medium sized high explosive bomb, and a high explosive bomb landing in the middle of an empty holder and exploding would do practically the same amount of damage as a holder with gas in it. Probably the most dangerous thing with the holder in use would have been incendiary bombs falling round the perimeter.

With the column-guided holder being used as a single lift, and only 360,000 cu.ft. storage, we were in an intolerable position so I got in touch with the Oxley Engineering Company and Mr. Hollis submitted the following ingenious solution to the difficulty. He would cut the dip away 1 in. from the outer sheets, and prepare a new apron plate and top plate at his works. In the meantime we were to keep the holder with the cup floating above the water during daylight, while his welders repaired the bottom of the cup and put a complete new bottom row of sheets all the way round on the top of the existing sheets. He would then swing the new dip into position and weld it to the outer ring. This he did, and we began to fill the holder, which was rather exciting, but the lift rose successfully and the holder has been in continuous use ever since. We started the job on Sept. 25 and on Nov. 13 we were using the whole holder. Bearing in mind we were only allowed to work in hours of daylight, as the police were at that time very particular about flashes of light, this was exceptionally good work.

Relief Holder

Owing to the loss of the spiral holder as a relief holder, we obtained permission from the Board of Trade to erect a small one 30 ft. in diameter and 24 ft. deep, with a capacity of 15,000 cu.ft. realizing that we might need to use the water gas plant more than we originally intended. As we had found steam rather short when using C.W.G. in pre-war days we put in a new Lancashire boiler at the same time.

The loss of the use of the waterless holder, which gave 8½ in. pressure, necessitated the provision of a booster with which to give a much increased pressure for the Sunday dinner time load.

After listening to Mr. Cranmer when he was President, we installed an electro-detarrer, which has proved successful.

The carpet industry does not use gas for process work, so our consumption in 1939 only dropped by the loss of street lighting, but in common with other small towns in the autumn of 1940 we received gloriously vague enquiries for supplies of gas for munition works. We were very careful about these enquiries as people who requested a 1-in. supply and a small meter were very shortly complaining that they were short of gas. On investigation we found they were trying to supply apparatus that required several hundred cu.ft. per hour. On the other hand one demand was for a 12-in. main to be laid forthwith, but with no conception of the ultimate consumption. However, the result was that by the end of the war we had grown from 250 million cu.ft. to 360 million without any extensions, and we have since, with great production difficulties, reached a make of over 400 million cu.ft.

The difficulties and problems attendant on coping with an expanding output with a restricted site are many and varied. Before we had any idea of buying the extra land we have just acquired, it was planned to enlarge the works and we have on order a new retort house with a setting of 12 Woodall-Duckham retorts, and we are hoping to put in new condensers, exhausters, static washer, electro-detarrer and station meter, but with a new layout which has been evolved covering the ground where our present stores, fitting shop and garages are, ground which will be cleared when we have transferred to the newly acquired buildings.

Advertising

Advertising of gas is thought to be something essentially modern, but the value of it was realized many years ago. A subtle means of bringing gas lighting to the public notice was used in the early days of the Company. They granted all churches and chapels free lighting, but this was abolished during the '70's because it was found that some of them anticipated gas heating and lit up on Saturday afternoon in the winter to reduce their cost of heating.

During 1944 a section of the town gas supply was unduly low and on testing we found that a main on a slight hill was not giving the pressure we thought it should. We opened it in sections and cleaned it. From it we took about 5 cwt. of large gravel, which had evidently been thrown down by small boys while it was being laid, and we also found a hat, a walking stick, and a purse containing receipts dated 1869.

Bearing in mind to-day's prices, we have a note in a minute book of July, 1836, that customers buying gas by meter shall have the price reduced from 15s. to 10s. per 1,000 cu.ft. as from June 24 of that year.

The works were established on the canal 40 years before the railway arrived. We have to haul all our coal nearly a mile from the station. Some 39 bombs, H.E. and mines were dropped in the Borough of Kidderminster during the war. The nearest was 400 yds. away from the works. In July, 1940, a parachute dropped from a German 'plane and was caught in a tree on the works about 4 a.m.

Presentations

More recognition should be given to long service in the Gas Industry. Many large works give their employees certificates, medals, and watches. In my opinion men who have been in various works should receive similar recognition. The way to do it is for a central body—say, the British Gas Council—to draw a small subscription from all works interested. When a man has come from another works and has served 10 years, but has completed 25 years all told, he should receive, say, a wrist watch. The undertaking would pay its portion of 10 years and the remainder would come from the common fund. The presents would be all standard for each period and the name of the undertaking and the man would be all that would need to be added.

I have suggested this to the National Gas Council, the British Commercial Gas Association, and the Federation of Gas Employers, but none of them felt it was their job. It would be very beneficial, for I find people are very proud of these things, and it would have a good publicity value. If nationalization comes this suggestion is of no interest, but if it does not, I commend it to your serious attention.

Women's Gas Council

Coventry Branch Gets to Work

A branch of the Women's Gas Council was recently formed at Coventry, when nearly a hundred women attended the last meeting of a "Better Homes" series at the Gas Showrooms, and all who had made a 60% attendance at the course were presented with badges by the Mayoress.

Miss D. W. Pidsley, of the Women's Gas Council, addressed those who had taken part in this series of their Homecraft Courses, sponsored by the Education Authority. She said that the Council came into being to act as a link between the consumer and the Industry. The W.G.C. was affiliated to other national bodies to work together to help the housewife to cut out the drudgery experienced in the past.

The Mayoress, Mrs. Briggs, was elected President of the Women's Gas Council (Coventry Branch). Seventy names of intended members were taken, and a mannequin parade and fabric and textile lecture were arranged for the first meeting.

The Coventry Gas Department encouraged attendance at its recent series of cookery demonstrations by the distribution of an attractively-designed invitation card, addressed to "Mrs. Housewife of Coventry," which was distributed in batches of 500 each week to different districts. In spite of the inclement weather, the demonstrations were particularly well attended, with an average of 90 people at each lecture.

Cheltenham Next

A four-day programme has been arranged for the inauguration of a new Cheltenham and District Branch. The Mayor of Cheltenham, Councillor H. T. Bush, will open the proceedings on April 29, Miss Pidsley will speak, and Gas Industry films will be shown. Films, cooking, and laundry demonstrations will occupy the day on April 30. On May 1 specialists in their respective fields will deal with infant welfare, the Food Leader scheme, welfare food administration, and dental hygiene. Home furnishings and renovations will be the subject of the closing day's programme on May 2.

Appliances and products will be shown by Ascot Gas Water Heaters, Ltd., Cannon Iron Foundries, Ltd., Friedman-Athill, Ltd., V. P. Sheet Metal, Ltd., F. B. Leopold & Son, Ltd., Shirers and Lances, Ltd., the United Chemists Association, Ltd., Winchcombe Flour Mills, Radiation, Ltd., and Electrolux, Ltd.

Experiences with a New Type of Coke Extractor on Vertical Retorts*

By W. W. CHISHOLM,

Slough Gas and Coke Company

A STUDY of the patent record reveals that a very large number of devices have been proposed for the extraction of coke from the continuous vertical retort. After some 40 years' practice, however, two types only have been adopted in the very great majority of installations in operation, viz., the helical scroll of the Woodall-Duckham and the "worm" extractor of the Glover-West systems. The object in both these designs is to release the coke with the minimum amount of breakage.

We are concerned in this Paper with a development of the latter design which itself may be described as a helical inclined plane which is withdrawn from beneath the charge allowing it to fall into the coke chamber.

In their enclosed intermittent retort Messrs. West's have used an "arcuate" cut-off plate made integral with the back of the cooling chamber into which a substantial fraction of the charge is allowed to fall at the end of the carbonizing period. In the present development of the continuous retort discharger the cut-off plate has been applied to a table which is horizomtal when at rest but which is tipped at short intervals.

The effects of the new device on the details of operation are of considerable technical interest. They are described in the following notes.

Carbonizing Plant at Slough

The whole of the coal gas plant at Slough consists of Glover-West continuous vertical retorts arranged in three benches as follows:

No. 1 bench of 12 50 in. retorts arranged in rows of two and heated by the usual Glover-West method of horizontal combustion chambers and waste gas circulators. This bench was originally constructed in 1935 and the retorts were constructed with the then standard bell-shaped steaming chamber. In 1942 the bench was reconstructed with straight through retorts and secondary air preheating by two passes at the base of the retorts; otherwise the setting was the same as previously. This is the bench now fitted with the new type of discharger.

No. 2 bench was constructed in 1938, and is identical with the original No. 1, that is to say, it consists of 12 50-in. retorts with steaming chambers. The coke from both these benches is wheeled out of the houses by manual labour.

No. 3 bench was constructed and put to work in 1940-1942 and consists of 32 50-in. retorts arranged in four beds of eight heated on the "balanced heating" system. This bench is fully equipped with coal and coke handling machinery.

Proposal to Install Sector Dischargers at Slough

In 1945 No. 1 bench was due for resetting and a considerable amount of bottom ironwork required renewal. West's Gas Improvement Company suggested that this was an opportunity to install a new type of coke discharger which had been developed by them on a pilot unit at Liverpool. A single retort had been operated with this new discharger at Liverpool for about two years, and further retorts had been fitted and were operating satisfactorily.

Mr. Dyde and I examined this new departure from the traditional worm type extractor at Liverpool and were extremely impressed by the ease of the working of the retorts to which the new devices were fitted. I should like to mention here our appreciation of the courteous, manner in which we were received by the Chief Engineer, Mr. Hubbard and his staff, and to thank them for the very valuable information so willingly given.

The most obvious effect on the working of retorts fitted with the new sector discharger was a marked reduction in the labour of top rodding amounting practically to its elimination altogether; and this was accomplished on old retorts which had deteriorated to the point of being difficult to work with the original extractor.

The operating staff at Liverpool were all satisfied that the new discharger was a very definite improvement from all points of view.

The advantages of this extractor in comparison with the worm type are outlined below:

(1) Positive movement of the charge at predetermined times resulting in reduction of rodding.
(2) Greater accessibility to retort for inspection and repairs.
(3) Production of higher density coke with less breeze.
(4) Reduced maintenance costs.
(5) No continuously operating machinery—giving time for minor repairs between operations.
(6) Lower power costs.

It was decided to take the opportunity afforded by the reconstruction of our No. 1 bench to carry out a full-scale trial of the new type of discharger.

(At this stage the Author gave a description of the discharger. A similar illustrated description was published in the "JOURNAL" of Jan. 1, 1947.)

The Reconstructed Bench

In addition to resetting retorts, floor tiles and cross walls, part of the non-producer wall and waste gas flues were rebuilt. The retorts are of the new design with key blocks; and they are slightly different from our previous ones in the shape of the horizontal cross sections. In the original retorts the cross section at both top and bottom was approximately elliptical; in the new retorts, the cross section at the top is elliptical, while at the base it is very nearly rectangular. Secondary air preheating is effected by double pass circulation at the base of the retort.

During the drying and heating process, which was carried out with all the usual precautions, the mechanical gear was tested out and run under no load conditions in an endeavour to detect any mechanical or electrical difficulties; none was experienced.

Individual retorts were coke-charged, the amount of coke discharged per tip was weighed, and the drop of the charge from the top of the retort was measured. The weight of loose coke discharged per tip was 3 to 3¼ cwt. while the drop of the charge was 3 ft. 10 in. under these conditions.

The plant was brought to work on Aug. 7, 1946, the procedure being as follows:

All tables were brought to the cut-off position and the retorts "coke-filled" with large coke to 4 ft. 6 in. below the top ironwork.

One half revolution of the gear was made, bringing the tables to the normal position and allowing the coke charge to fall. In this case the fall per retort averaged only 12 in. against the previous 3 ft. 10 in. for a complete oscillation, showing that with loose coke there can be considerable and varying slip.

The coke charges were allowed to heat up for about two hours, when the steam was turned on for half an hour. The retorts were then coal-charged. Two hours later one complete tip was made. Each charge dropped 60 in. to 63 in.

It was intended to make the next drop after two hours, but owing to the unexpected large fall it was deemed advisable to prolong this period to three hours. Although the charge at this stage was static the usual rodding was carried out. The amount of loose coke discharged per tip was very regular at 3½ cwt.

The periods between each tip were progressively reduced until at the end of 21 hours the period was set at one tip per hour, and the apparatus turned over from hand to automatic control. During this time the amount of coke discharged per tip reduced from 3½ to 2 cwt., now that the carbonized charge was coming through, and the consequent drop of the charge reduced from 61 in. to 30 in. The latter figure has been maintained with remarkably little variation.

The temperatures of the setting were gradually increased and the time between drops reduced, until eight days later a drop every 40 minutes was reached, giving a throughput of about 5.4 tons per day. Temperatures of 1,330° C. maximum in the combustion chambers, graded to 950° C. at the top circulating chambers, were maintained.

Operation of Plant

The travel of the charge through the retort has been excellent, and it has never been necessary to rod a charge to move it. Rodding is

* Paper to the Southern Association of Gas Engineers and Managers (Eastern District), Mar. 25.

carried out just after each drop; this is done to make certain that the charge has dropped evenly.

I do not think that routine rodding can be of any use for the following reasons:

First, if the rodding is done just after the drop, as we do, it cannot be effective if the charge has already fallen. We use a 6 ft. rod which will penetrate only a total of 4 ft. 6 in. into the charge, and as 2 ft. 6 in. of this is fresh coal, only 1 ft. 6 in. of the rod can enter the partially carbonized coal. If the rodding is done just before the drop, provided the charge fell at the previous drop, there is no free space below for the charge to fall into.

The principal reason for our continuance of rodding is to be reasonably sure that the plant is having routine attention, and because if we discontinued rodding for this particular bench, it would upset the operators in the worm-extracted houses. On purely technical grounds the operation of rodding could probably be discontinued.

The capacity of the coke chambers is sufficient for two tips of the table and, as all coke from this bench is manually transported, it is necessary to maintain strict routine in emptying the chambers to be sure that a tip does not take place while the mouthpiece lid is open.

The mechanical operation of the plant has been perfect, no adjustment whatever has been carried out; even the amount of lubrication required is small. A few minor electrical troubles have been easily dealt with and do not recur as we gain experience.

As this was the first installation of its kind it was necessary to determine the size of safety pins required. This was accomplished by starting with a pin which was too heavy and gradually reducing the diameter until the breaking size was reached. A pin of $\frac{1}{4}$ in diameter bends under normal load, and a $\frac{3}{16}$ diameter pin shears. The standard pin now used is $\frac{7}{16}$ in. diameter mild steel. This pin becomes fatigued due to bending in alternate directions after about one month's work, and is difficult to extract. It is now routine practice to inspect and, if necessary, change the pins at scurfing times.

The procedure of putting retorts back to work after scurfing is somewhat different from that of the normal type of extractor. The procedure is as follows:

The table for the individual retort is first turned by hand after removal of the safety pin, by means of a hand-operated winch, to the cut-off position. The retort is then coke-charged to 4 ft. 6 in. from the top ironwork, and the table brought back to normal again. The retort is then coal-charged as usual and tips of the table are made, say every third tip of the usual schedule.

To do this it is necessary to remove the safety pin for the tips which are not required and replace for the operating tip. This taking out and replacing pins, although not difficult, is not so easy as the normal

View of coke chambers showing driving mechanism. Stop switch is shown fixed to column

gradual increase of " pegging " with the worm extractor. The holes of the two arms do not always align properly, and the position of the pins is not conducive to easy change. There should be no difficulty in dealing with this in future design.

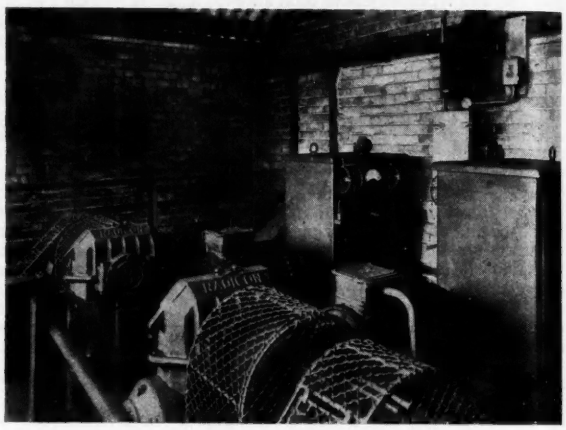
Observations and Tests

Coal Carbonized. Since putting this bench to work, the coal carbonized has been of widely different grades from the South Yorkshire and Derbyshire coal-fields, as well as very mixed coal from stock, including house coal slack, and a small amount of Durham. The bulk of the coal has been good coal from the vertical retort carbonizer's point of view, although there has been a small amount of " difficult " coal. It has been impossible to segregate the various qualities under present-day conditions, and at most times we could not be sure which description of coal was actually passing through the retorts.

Throughout the whole period every coal has passed through the sector-discharged retorts without difficulty, whereas in the worm-extracted retorts some of the coal or mixtures of the same type gave various degrees of trouble, especially with coal having high slack content. Generally speaking, good coal is trouble-free throughout all three benches; but with the sector discharger there has been no trouble even with the most difficult coals.

The first item noticed when this bench went to work was increased pressures at the bottom mouthpiece. These pressures vary considerably, from 2/10 in. to over 2 in. water gauge. The class of coal being carbonized undoubtedly has a considerable influence on pressure conditions in the retort. When nuts are being passed through the retort, the pressure is generally lowest (2/10 in.) immediately after a drop, and gradually increases to 12/10 in. just before the next drop.

Scurf Formation.—Due to the shortage of manufacturing capacity 10 retorts out of the 12 were allowed to run six to seven weeks before scurfing. While the bench was working several large pieces of scurf were recovered from the coke discharged from the retorts. The



View of driving gear

scurf itself was unusual in appearance, consisting of a thin, hard layer next to the retort wall, needle-like formations of hard carbon at right angles to the first hard layer, and, next to the charge, a comparatively soft, spongy layer, with pronounced lamp black deposits. Further, several pieces showed no signs of abrasion from the descending charge.

When the retorts were put off for scurfing it was found that the scurf formation was unusually low in the retorts. Commencing from the top, the first 6 ft. had practically no scurf. At this point the formation commenced, increasing to about 12 to 14 ft. down, where it was as much as 2½ in. thick, and continuing to be of that thickness to about 16 ft., where the thickness decreased, until at 20 ft. there was practically no deposit. At the time when discharge of scurf with the coke was observed, all the retorts continued to operate smoothly. With continuous coke extraction by the worm method, we have found that the retort would have been unworkable until it had been fully de-scurfed.

In order to prevent a repetition of this excessive scurf formation the heating of the bench has been re-arranged, the bottom two combustion chamber temperatures being decreased by about 30° C., and the three higher chambers increased approximately 20° C. At the same time a short scurfing schedule of between 21 and 28 days has been maintained. Since this alteration was carried out we have not had any scurf extracted with the coke, but the formation is still the same type, though not so heavy, which proabably shows that the shortened scurfing cycle is preventing the growth, while the alteration of the temperature gradient has little, if any, effect.

Travel of Coal Through Retort.—Tallies were inserted to determine the length of time the coal takes to travel through the retort. This was found to be an average of 8 hours 20 minutes, with a 40 minute cycle or 12½ drops, plus another 2½ drops in the extractor casing.

Tallies placed along the length of the major axis all came out together, except the one under the offtake pipe, which was originally placed slightly lower, showing that there was even travel over the major axis of the retort.

It was thought that there might be a possibility of coal particles passing between the monolithic charge and the retort wall. To test this the charge was lowered to just below the top mouthpiece, by omitting to open the coal valve, and about 12 in. thickness of broken firebrick was placed on the top of the charge; the descent of this refractory pad was timed. Some of the pieces of firebrick were re-

covered up to 8 ft. ahead of the main charge, indicating that there may be passage of coal between the main charge and the retort wall.

Coke Screening Tests.—The coke produced is larger and slightly more dense than that produced from worm-extracted retorts. It has a very good appearance and there is an absence of the light, fluffy, sponge-like formations that sometimes occur in worm-extracted coke. When carbonizing crushed coal with a large amount of fines the appearance of the coke resembles that from fully charged horizontals.

Coke Screening

Coal used ... ... Staveley nuts

Type of extractor	Sector		Worm	
	Bulk density lb. 1 cu.ft.		Bulk density lb. 1 cu.ft.	
As discharged	21	100	20	100
Over 2 in.	19	65.3	18	54.0
1½ in.-2 in....	21	17.8	20	18.5
½ in.-1½ in....	22	10.1	21	16.4
0 in.-½ in.	34	6.8	25	11.1

The above test was made with a throughput of 5.4 tons approximately for each type of retort (sectors tipping once in 40 minutes).

Throughput.—The throughput normally maintained is 5.4 tons per retort with a 40 minute cycle, but during peak demands for gas this has been stepped up to 6.1 to 6.2 tons with a 35 minute cycle. This has been accomplished without technical difficulty, and can easily be maintained. The throughput is remarkably even and some dozens of weighings of coke discharged per tip have been made, the highest being 2¼ cwt. and the lowest 2 cwt.

Test to Determine Run Through of Coke During Tipping.—When discharging a retort filled with loose coke the discharge per tip is up to 3½ cwt. while the normal discharge is only 2 cwt. This difference must be due to loose coke running past the table during the operation. It was felt that if loose coke could run through to the extent stated, the retorts " own coke " might also run through to some extent.

The slip on the return stroke of the extractor was measured by arranging a test as follows: A forward stroke was completed; the machine was then stopped and the coke chamber emptied; the return stroke was completed, and the coke dropping during this return stroke was weighed and found to be 30 lb. A small alteration is contemplated to obviate this.

Double Tip.—It was thought that a harder coke might be produced if the amount of coal per drop (*i.e.*, the static period) was increased. This was tried by arranging for two operations of the extractor in rapid succession every 80 minutes instead of one in 40 minutes. As the throughput would not be altered the temperatures were not changed, and only one line of six retorts were given the double drop. The line next to the producers was selected for this experiment as it is normally slightly hotter.

Carbonization seemed to be proceeding normally and the plant generally worked quite smoothly, but after about 24 hours it was noticed that the coke from the double drops was not so well carbonized as the single drop retorts. The coke from the double drops was not materially different, and the experiment was discontinued.

Power Consumption, Repairs, and Maintenance.—We have made several attempts to ascertain the power requirements of the driving motors, but find it impossible to read the standard type of ammeters three or four times in the period of 15 seconds that the motors are running. The total time that the machinery is in operation is only 25 hours per year; hence power consumption, wear, and tear, together with lubricating oil usage, must be relatively low. Routine lubrication by grease gun is carried out daily. The electrical starting system requires more attention than the original system, but the amount is still small.

Inferences

Coal Travel Through Retort.—From the foregoing observations it is possible to gain an idea of the passage of coal through the retort. In the first place, the coal travels through the retort in a series of drops and remains static for a pre-determined time—say 40 minutes. It is therefore necessary, when describing the state of the charge, to consider the time it has been static. After a drop, with the simultaneous entry of new coal from the box, the top 30 in. in the retort proper will be raw coal. During the course of the next 40 minutes, this coal will receive heat from the walls of the retort, which will rapidly carbonize the outer layer, forming an outer wall of coke and containing the charge as a monolith for some considerable portion of its travel. During this coke formation there will be an expansion of the charge. At the end of the 40-minute period the next drop will take place. The charge will already have taken the shape and size of the upper zone, and now falls into the second position, which is slightly larger than the original. This may make a clearance between the coke wall and the retort. Through this opening it may be possible for small coal to pass, as indicated by the broken firebrick test.

During the time the charge is in second position more carbonization and expansion takes place, until, at the end of the static period, or some time before, the charge is again touching the retort. It has been noted that the scurf formation at the top 6 ft. or so of the retort is very slight due probably to a low formation in the first place, and also to the fact that the abrasion of the descending charge is scratching the scurf away as fast as it is being formed.

The above process is probably repeated with decreasing expansion in the third and fourth positions, allowing scurf formation on the retort. In the next positions the expansion is not so great as the increase in cross sectional area, and the charge may then stand clear of the retort wall during the whole time it is in these zones.

By the time the charge is completely, or almost completely, carbonized, contraction takes place which splits the charge, and the shock of the drop breaks the monolith. The coke then completely fills the bottom sections of the retort. Thus, broadly speaking, there is coal completely filling the cross section at the top, and more or less fully carbonized charge filling the bottom sections, while in the central zones of the retort, the monolithic charge is possibly standing clear of the retort walls. The shattered coke zone in a sector discharged retort is probably longer than that of a worm discharged retort, due to the breaking effect of the intermittent drop.

Scurf Formation.—The scurf formation is more rapid than that in continuous vertical retorts; the following reasons are suggested:

(1) The monolithic charge standing clear of the retort walls at the central sections, all the scurf that is formed stays in position, while in the more nearly continuous worm-extracted retort the scurf is partially eroded by the descending charge.
(2) It is known that coal can fall between the monolith and the walls; this falling coal will carbonize very rapidly in the free space, which will produce the scurf and the lamp black.
(3) The drop of the charge due to the extractor may break the plastic layer allowing more hydrocarbons to pass from the central zone to the outer area, again resulting in scurf formation.

Pressure at Bottom Mouthpiece.—Generally the pressue is higher than normal and builds up between drops. As there seems to be more free gas way in sector discharged retorts, this is contrary to expectations. A possible explanation, which I cannot confirm, may be of interest.

The general increase can be due to the deeper " shatter zone " of the retort, and this coke in the fairly long cast iron cooling chambers above the extractor may throw a higher back pressure than the corresponding zone of the worm-extracted retort. The building up of pressure can be due to the fact that, just after a drop, the top is full of fresh coal which has a fairly clear gas way; as carbonization proceeds, this charge expands, closing the gas passages to some extent and thus producing a higher back pressure. In the zones below the top, the charge at first does not fill the cross section, allowing an easy passage for the gas; during carbonization this portion of the charge again expands and closes the gas way again, tending to increase the back pressure. The slight pressure at the bottom mouthpieces is an advantage in so far as it prevents the intake of air either through fittings, or when the doors are open for discharge.

Gas Production.—Although we have not been able to measure the quantity of gas produced there is every reason to believe that it is at least equal to, or may be slightly in excess of, that produced in the worm-extracted retorts. Owing to imperfect bottom doors and water spraying in the coke chamber, it is impossible to assess the amount of steam reacting to form water gas, but the analysis of the gas produced shows high CO and low CO_2 contents.

A typical analysis taken from the foul main shows:

CO_2 and H_2S=3.0; O_2=Nil; CnHm=1.8; CO=14.8; CH_4=25.4; H_2=50.9; N_2=3.0.

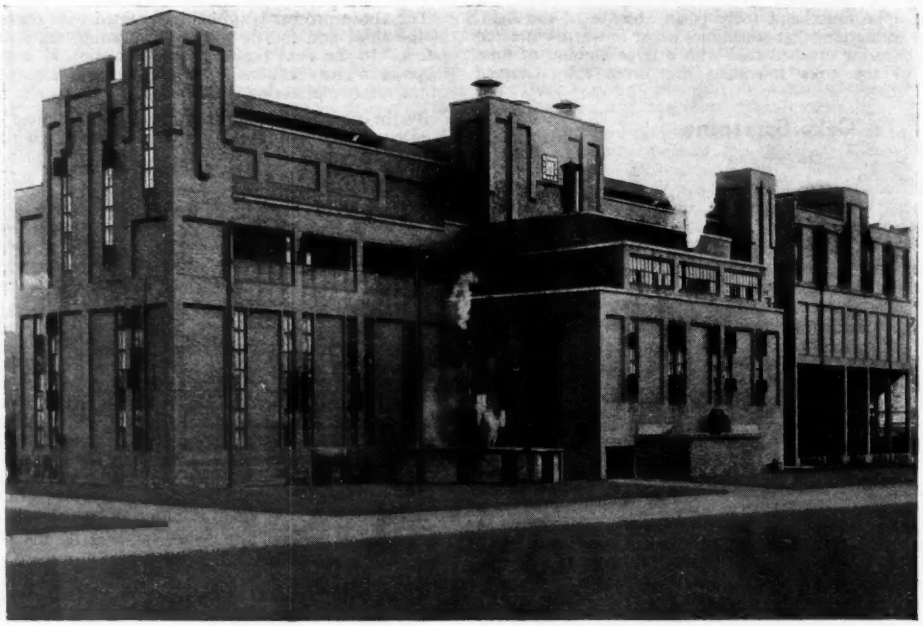
Conclusion

During the erection of this bench my Chief, Mr. Dyde, agreed that an early presentation of our experiences with this new type of discharger would be of general interest, and he, as Chairman of the Eastern District of this Association, kindly fixed this date. By this time it was expected that a comprehensive review of the working would be available. But unfortunately the completion was delayed; the separation of gas streams has not been possible, and we have not been able to segregate coals of various classes under the present-day difficult supply position.

In these circumstances I must express my regret for presenting a very incomplete picture of this installation as a carbonizing unit. I can, however, state that these sector dischargers, during our experienc so far gained, have operated with the utmost ease, and indicate a probability of improving the working conditions and the performance of continuous vertical retorts, coupled with a reduction of maintenance costs.

All our staff prefer to operate this plant rather than either of the other units. It is certainly more positive in the amount of coal carbonized, that is to say, if the number of tips per unit time is increased or decreased, the results show on the station meter.

Finally, I should like to thank Mr. Dyde, the Engineer and General Manager of the Slough Gas and Coke Company, for his help and permission to read this Paper. I should also like to thank the technical staff at Slough for their help in making the observations and preparing the technical data.



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Load Development in the Ascot Area

FOLLOWING is a report of the discussion on the Paper on "Load Development and Distribution in the Ascot Area," which Mr. J. W. Kaye, Gas Engineer and Manager of the Ascot Gas and Electricity Company, presented at a meeting of the Southern Association of Gas Engineers and Managers (Eastern District) on Feb. 25. The Paper was published in the "JOURNAL" of Mar. 26 (p. 620) and April 9 (p. 94).

The **Chairman** (Mr. J. H. Dyde) said the Paper was a fascinating story which reflected great personal credit on the Author. He had seldom read a Paper which expressed so clearly the importance of personal contact with the consumer. Consumption per consumer, that index of progress and prosperity, was troubling them very much in the 1930's. Most companies were showing a reduction in that index and sales efforts were being put forward to an increasing extent, and this Paper showed what was done at Ascot. The abnormal circumstances of the immediate present should not be allowed to confuse the issue, for assuredly the time must return when they would come back to the question of consumption per consumer. The question of development in rural areas had been raised in every post-war planning report. Not all of them would agree with the Author's statement on the proper set-up of a promotional tariff, but it must be agreed that it had produced results. There was a great deal to be said for the fixed charge being based, as it was, on the central heating and bulk water supply tariff and hourly rate demand, for thereby the consumers who made the greatest demands on the network paid proportionately the greater charge. There was another sound point in Mr. Kaye's policy in that he designed his hot water installations with an ample water storage capacity, thus tending to reduce his distribution costs by increasing the load factor.

With regard to the distribution system, he had had an opportunity of seeing the high pressure system serving Bracknell. It was a very neat, business-like job, fully automatic, and perfectly safe in operation. He would, however, like to ask the Author whether he had any fears regarding corrosion of the single line steel high pressure distribution, and had he any plans for duplicating it or providing safeguards against the time when repairs or renewals must be carried out. In his sales organization the Author had shown a forceful and realistic outlook, and his sales per consumer were exceptionally high.

District Representation

Mr. **P. G. Wright** (Slough) said the description of the high pressure storage system was very fascinating, but he thought the main point of the Paper was the extent to which Mr. Kaye's sales policy, in having special district representatives, had paid the undertaking. It amazed him that so many undertakings still relied on district inspectors to act as fitters' foremen and sales representatives; a very small percentage of men could do such a job efficiently. Mr. Kaye had increased his consumption per consumer from 250 to 338 therms, which compared with an average of 170-250 therms for half a dozen other undertakings whose results he had examined. The pre-war average for slot consumers was 77-80 therms, increasing to 110 during the war, but Mr. Kaye's figure had grown from 69 to 135.

He entirely agreed with Mr. Kaye that gas was the most convenient form of fuel, but he disagreed with him in regard to air control in the house of the future. From the gas rate point of view their biggest and most useful load lay in domestic hot water coupled with background heating.

Mr. **W. Johnson** (Wandsworth) speaking from the point of view of the Woking undertaking, said he thought the most important point the Author had made was the question of central heating and hot water. It was a matter with which he had been very much associated and he had already produced quite a lot of data on the subject. The Woking Company adopted about 1934 a two-part tariff for central heating and hot water. They viewed the possibilities of basing it on the installation rate or the method used by the Gas Light and Coke Company, of rateable value taken in conjunction with the size of the house. They came to the conclusion that they preferred the rateable value and size of the house as their basis. They tried the installation load principle where they had commercial premises, and they were satisfied that it gave them the results they were seeking. They started with a commodity rate of 4.75d. per therm, but since then prices had risen, principally on the manufacturing side and the commodity rate had had to go up fairly considerably, because they felt the rate must cover the net manufacturing cost, plus something for their trouble. The rate was now up to 9d., and they would probably have to go still higher. Up to the present the increase had not affected business, because with present-day difficulties in regard to raw fuel and the obvious tendency for greater comfort in the home he thought a bigger price could be got for central heating than was possible before the war.

The question of balancing the load had been argued many times at great length. He thought it could best be achieved by combining a circulating system with central heating. In the Ascot area, as in the Woking area, there was no industrial load, and the biggest field lay in water heating and the baking load. Circumstances were now forcing bakers to consider gas as a fuel, at prices which they would not have entertained before the war. Other speakers had commented favourably on the consumption per consumer. He did not think it was fair to compare consumption per consumer with the London companies, because undertakings like Woking and Ascot showed better figures.

He asked to what extent Mr. Kaye had increased his commodity rate, and congratulated him on the quite obvious co-operation between staff and management, and also the stress he had laid on the personal element.

Mr. **C. D. Shann** (Gas Light and Coke Company) said he was fully in agreement with the Author that the laying of mains in verges cheapened the cost of installation and future maintenance, but he did not quite understand his reference to the reduction of leakage, as he would not have thought that the vibration of traffic would have much influence.

Mr. **G. G. Warne** (President, London and Southern District Junior Gas Association) said the Author's action in replacing all black cookers with newer ones of the enamelled type was most commendable. At the same time he was surprised to learn that gas pokers had been given away. He could not help feeling that that was really an unnecessary step, as gas pokers had been one of the best selling lines for many years. With regard to the high pressure distribution system, he wondered whether they had had any difficulties regarding internal rust, and whether any special precautions were taken.

Mr. **F. Dawson** (President of the main Association) said he noticed that Mr. Kaye referred to an automatic control in the boosting plant, which cut off at a predetermined inlet pressure of 3 in. W.G. an an outlet pressure of 5 in. W.G. He would like him to explain how this system operated.

The Author's Reply

Mr. **Kaye**, replying to the discussion, said that with regard to the single high pressure line, it had gone on for 12 years without any trouble. If they had embarked on a larger programme they could not have done what they had because the capital costs would have become prohibitive. Reference had been made to the increased consumption per consumer. Actually there had been an increase of about 40% for slot meters and only about 20% for ordinary meters. The Ascot Company produced its central heating tariff before the South Eastern Corporation produced its domestic tariff which was, as members knew, based on the Gas Light and Coke Company's tariff. The larger houses in the area were outside the scope of the two-part domestic tariff entirely, and some of their standing charges were based on demand; in one case it was as much as £60 a year.

In reply to Mr. Johnson, whose Woking area adjoined that of the Ascot Company, he agreed that floor area plus rateable value was a proper basis for the standing charge for the smaller type of house, but he still thought that the installation or demand rate was better for the larger houses. The present-day commodity rate was 8d. per therm, and they had not lost any business, though new business was difficult to get because of the shortage of appliances. Mr. Warne had referred to free gas pokers. Perhaps it would have been right to sell them, but they had always felt the gas poker was such a potential source of consumption for such a small outlay that they could afford to make a present of it to encourage the use of gas among the slot consumers. Regarding internal rust deposit, the high pressure mains had been laid approximately 14 years and they had not had much rust deposit getting through the governors. They used screens at the governor inlets and there was quite an appreciable amount of deposit which was cleared out. With regard to a point raised by Mr. Dawson, the high pressure reducing governor was a motorized valve which shut down between midnight and 6 a.m. to prevent any circulation of the gas.

Mr. **L. Poulter** (Gas Light and Coke Company) proposed, and Mr. **J. G. Abbott** (Windsor) seconded a vote of thanks to the Author, to which Mr. Kaye briefly replied.

Preliminary Steps for the building of an experimental coal distillation plant in Lanarkshire, aimed at reducing the unemployment total in the county, were discussed at a meeting under the auspices of the Scottish Reconstruction Committee at Glasgow, when it was decided to send a resolution on the subject to the Prime Minister, the Minister of Fuel and Power, the Minister of Labour, the Secretary of State for Scotland, and the National Coal Board.